

EPA Region 5 Records Ctr.



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File 0081300-04-15

Mr. John Seymour, P.E.
YCRG Project Coordinator
GeoSyntec Consultants
55 W. Wacker Drive, Suite 1100
Chicago, IL 60601

Subject: December 2003 Groundwater Monitoring Report
Yeoman Creek Landfill Superfund Site
Waukegan, Illinois

Dear Mr. Seymour:

Weaver Boos Consultants, Inc. (Weaver Boos), sub-consultant to TJ Lambrecht Construction, Inc., (TJ Lambrecht) has completed the above referenced monitoring for the Yeoman Creek Landfill Superfund (YCLS) Site located in Waukegan, Illinois. The Yeoman Creek Superfund Site includes Yeoman Creek Landfill, Edwards Field Landfill, and Rubloff Landfill.

December 2003 Monitoring Event

Weaver Boos was present at the YCLS Site to conduct the necessary fieldwork from December 1, 2003 to December 9, 2003. The subject monitoring event included a total of 74 monitoring locations as follows: 43 groundwater wells, 3 leachate wells, and 28 landfill gas probes (see **Figure 1**). A summary of the scope of the December 2003 Monitoring Event is provided as **Table 1**. Pursuant to United States Environmental Protection Agency (USEPA) Correspondence dated May 30, 2003, each well south of the Com Ed right-of-way was sampled for the initial parameter list and each well north of the Com Ed right-of-way was sampled for volatile organic compounds (VOCs), metals and cyanide. In addition, field parameters, water quality parameters and groundwater elevation measurements were obtained from each well during this event. Groundwater elevation measurements were collected from each of the 74 monitoring locations with the exception of three landfill gas probes. Landfill gas probe LFG-110 is located under a

tire chip pile and is presently inaccessible, LFG-105 was previously removed from the monitoring network to allow for placement of a soil stockpile, and LFG-106 had an obstruction in the well, which prevented depth to water level measurements from being obtained. TJ Lambrecht was notified of this situation following the June 2003 monitoring event.

Field work was performed in accordance with the site specific Field Sampling Plan (FSP) prepared by GeoSyntec Consultants, dated August 2001, and the Pre-Design Data Collection Activities Quality Assurance Project Plan (QAPjP) prepared by Parsons Engineering Sciences, Inc. dated August 1999.

A representative from R.F. Weston was present on-site to oversee sampling activities on behalf of the USEPA.

Groundwater and Leachate Sampling

Depth to groundwater measurements were taken over a one-day period at the beginning of the sampling event, prior to purging any of the wells. This method is believed to provide a more representative depiction of the groundwater and leachate flow in the vicinity of the site (see **Table 2**).

The wells were purged with dedicated tubing and a peristaltic pump using a low-flow technique. A flow through cell was used to measure pH, temperature, conductivity, dissolved oxygen, and oxidation-reduction potential. Turbidity was measured using a separate turbidity meter. A colorimeter and mixing agents were used to field test for ferrous iron in accordance with the FSP. The wells were purged until field measurements were stable in accordance with the FSP. In accordance with the FSP, field parameters are considered stabilized when three consecutive measurements vary less than ± 0.1 unit pH, ± 10 percent of conductivity, $\pm 0.5^{\circ}\text{C}$, and less than 10 NTU for turbidity. The final field measurements collected during purging are summarized on **Table 3**.

Field parameters were collected from 22 Shallow Zone monitoring wells, 20 Lower Outwash monitoring wells, 1 bedrock well, and 3 leachate monitoring wells (see **Table 1**). Monitoring wells were purged and sampled in general accordance with the FSP. Samples from each well south of the Com Ed right-of-way were analyzed for the initial parameter list, and samples from each well north of the Com Ed right-of-way were analyzed for site specific VOCs, metals (total and dissolved phases), and cyanide (see **Table 1**). In accordance with the QAPjP, appropriate quality assurance/quality control (QA/QC) samples were collected during the sampling event.

Five duplicate samples, one trip blank, and three matrix spike/matrix spike duplicates were collected for laboratory analysis.

Laboratory Analytical Results

Samples obtained from 43 groundwater and 3 leachate wells were analyzed for either the initial parameter list (wells south of the Com Ed right-of-way) or VOCs, total and dissolved metals, and cyanide (wells north of the Com Ed right-of-way). A summary of laboratory analytical results, field parameters, and results of the comparison to Groundwater Quality Standards for Class I Potable Groundwater Resources (35 IAC 620.410) (Class I Standards) is included on **Table 3**. Exceedances of the Class I Standards are also summarized in **Figures 2 and 3**.

Leachate Wells

Leachate wells LW-101, LW-102 and LW-103, located on Edwards Field Landfill, were sampled during the subject sampling event. The following parameters were detected in the leachate wells at concentrations above the Class I Standards:

Parameter	LW-101	LW-102	LW-103
Chloride			X
Benzene	X	X	
Iron, total	X	X	X
Iron, dissolved	X	X	X
Lead, total	X	X	
Manganese, total	X	X	X
Manganese, dissolved	X	X	X

Lower Outwash Wells

The following constituents were detected in Lower Outwash wells at concentrations above the Class I Standards:

Location	Cl⁻	Fe_D	Fe_T	Mn_D	Mn_T	Ni_D	Ni_T
MW-101	X						
MW-105	X						
MW-112	X						
MW-201	X						
MW-205	X		X				
MW-209	X	X	X				
MW-213	X	X	X	X	X		
MW-301						X	X
MW-401		X	X				
MW-405	X					X	X
MW-D	X			X	X		
MW-F	X		X				

Cl⁻ - Chloride; Fe_D - Iron, Dissolved; Fe_T - Iron, Total; Mn_D - Manganese, Dissolved; Mn_T - Manganese, Total; Ni_D - Nickel, Dissolved; Ni_T - Nickel, Total.

Shallow Zone Wells

The shallow zone wells consist of wells screened in the lacustrine clays, organics, fluviolacustrine sands and upper outwash. The following constituents were detected at concentrations in shallow zone wells above the Class I Standards:

Location	As _D	As _T	B _D	B _T	Bnz	Cl ⁻	Fe _D	Fe _T	Mn _D	Mn _T	Ni _D	Ni _T	Pb _T	SO ₄	VC
MW-102						X	X	X	X	X					
MW-104						X	X	X							
MW-106							X	X	X	X					
MW-107									X	X					
MW-108											X	X			
MW-110								X							
MW-111							X	X							
MW-202						X	X	X	X	X					
MW-204						X									
MW-206	X	X	X	X					X	X					
MW-208							X	X	X	X				X	
MW-210							X	X	X	X				X	X
MW-211							X	X							
MW-212							X	X	X	X					
MW-215					X	X	X	X	X	X					
MW-216							X	X	X	X					X
MW-217							X	X	X	X					
MW-402			X	X		X			X	X				X	
MW-406						X		X		X			X		
MW-E1						X									

As_D - Arsenic, Dissolved; As_T - Arsenic, Total; B_D - Boron, Dissolved; B_T - Boron, Total; Bnz - Benzene; Cl⁻ - Chloride; Fe_D - Iron, Dissolved; Fe_T - Iron, Total; Pb_T - Lead, Total; Ni_D - Nickel, Dissolved; Ni_T - Nickel, Total; Mn_D - Manganese, Dissolved; Mn_T - Manganese, Total; SO₄ - Sulfate; VC - Vinyl Chloride.

During the subject sampling event, vinyl chloride was observed in MW-210 at a concentration of 21 ug/L, which is lower than the concentration observed in June 2003 (24 ug/L). Vinyl chloride was also detected in MW-216 at a concentration of 3.7 ug/L, which is similar to the concentration observed in June 2003 (3.8 ug/L). Also, vinyl chloride was not detected at or above the laboratory reporting limit of 1 ug/L in June and December 2003 at MW-103.

Bedrock Well

MW-403 is the only monitoring well screened in bedrock. No exceedances of the Class I Standards were identified for this well during the subject sampling event. Low flow sampling utilizing a peristaltic pump was unable to be accomplished at MW-403, because the depth to groundwater was 91.17 feet below ground surface. Therefore, MW-403 was purged and sampled using a polyethylene bailer consistent with previous sampling rounds.

Data Validation

Consistent with the data validation performed by Parsons on the October 2001 groundwater monitoring event (Round 6 of the Pre-Design Data Collection), data validation was performed on 10% of the data for the December 2003 groundwater monitoring results. The following samples which underwent data validation were consistent with samples validated during past sampling rounds, which are from monitoring well locations that have been subject to scrutiny under the Pre-Design Data Collection Program:

- MW-103
- MW-210
- MW-216
- MW-A
- MW-E2

Exponent of Lake Oswego, Oregon performed the data validation. The data validation report generated by Exponent is attached as **Attachment 1**. The data validation found that the quality control procedures employed by the laboratory during analysis were generally acceptable. A few instances were noted where data validation control specified quality control criteria were not met; however, no samples results were found to require qualification. Therefore, results of the data validation do not influence the analytical results summarized on **Table 3**. Please note, the laboratory reported analytical results for 4-methylphenol using analytical method SW-846 8270C. However, the data validation indicated that 4-methylphenol should have been reported as 3- & 4-methylphenol since SW-846 8270C cannot differentiate between these two semi-volatile organic compounds. Therefore, 4-methylphenol has been changed to 3- & 4-methylphenol on **Table 3**.

Consistent with data validation performed by Parsons on the October 2001 groundwater monitoring event (Round 6 of the Pre-Design Data Collection), the remainder of the laboratory data collected during the December 2003 sampling event is subject to a data review that consists

of checking for holding times, sample temperature, sample receipt, chain of custody, etc. Results of this data review are presented below.

Each sample cooler was received at a temperature less than or equal to 4°C. The Chain of Custody for each shipment to the laboratory indicates that each shipment was properly relinquished and received. The cooler receipt narrative indicates that signed and dated custody seals were present on each cooler shipped to the laboratory. The custody seals were intact upon receipt at the laboratory with the exception of one cooler in analytical lot # A3L060139. The custody seals were present on this cooler, however they were not sticking to the cooler due to cold temperatures encountered during shipment. Furthermore, tape was placed around each custody seal to try to keep the seals in place. Other packing material within this cooler appeared to be in order suggesting that the sample integrity was not compromised. Each sample was analyzed within the appropriate holding time with the exception of sulfide analysis for sample 031205-JR-EFL-GW-U-MW111. According to the case narrative, this sample was analyzed for sulfide outside of holding time due to a laboratory oversight. The case narrative for each shipment is included in **Attachment 2**.

Reporting limits for each parameter were compared to those included on Table 1.1 of the QAPjP. For the December 2003 sampling event, the laboratory reporting limits for cyanide (0.01 mg/L) were above the reporting limits specified in Table 1.1, which are 0.005 mg/L for cyanide. After contacting the laboratory regarding this issue, it was discovered that the reporting limits of 0.01 mg/L for cyanide are the lowest concentrations the analytical laboratory can reliably achieve, without reporting an estimated value. The analytical laboratory indicated that they can report lower than the reporting limit; however, these concentrations would initially be estimated, and therefore flagged as such by the laboratory. The laboratory reporting limits were the practical quantitation limits (PQL). However, the lower limits would be closer to a method detection limit (MDL). Values between the MDL and PQL would be estimated. Higher reporting limits were also present for select individual samples due to matrix interference.

Potentiometric Surface Maps

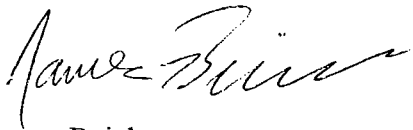
The depth to groundwater data from the wells screened within the lower outwash was used to generate a groundwater potentiometric surface map. As shown on **Figure 4**, groundwater flow for the lower outwash is generally towards the northeast.

The depth to groundwater data from the leachate wells and the landfill gas probes was used to create **Figure 5** (Potentiometric Surface Map for Leachate). The leachate elevation contours at Edwards Field generally show a radial leachate gradient directed outward from the landfill. The leachate elevation contours at East Yeoman Creek Landfill also generally show a radial leachate flow directed outward from the landfill.

We trust that this information is sufficient for your needs at this time. If you have any questions, comments, or suggestions regarding the data presented in this groundwater report, please contact us at your convenience.

Very truly yours,

Weaver Boos Consultants, Inc.



James Reich
Staff Scientist



Michael B. Maxwell, LPG
Project Manager

Cc: Mr. Ron Kapala, TJ Lambrecht

Attachments: Tables
Figures
Attachment 1 – Data Validation Report
Attachment 2 – Case Narratives

Tables

Table 1
Summary of Quarterly Monitoring - December 2003
Yeoman Creek Landfill
Waukegan, Illinois

Sample Description	Water Levels	Field Parameters	VOCs, Metals, Cyanide & WQ Parameters*	Initial Parameter List**
Groundwater Monitoring Wells				
MW-101	X	X		X
MW-102	X	X		X
MW-103	X	X		X
MW-104	X	X		X
MW-105	X	X		X
MW-106	X	X		X
MW-107	X	X		X
MW-108	X	X		X
MW-109	X	X		X
MW-110	X	X		X
MW-111	X	X		X
MW-112	X	X		X
MW-201	X	X	X	
MW-202	X	X	X	
MW-203	X	X	X	
MW-204	X	X	X	
MW-205	X	X	X	
MW-206	X	X	X	
MW-207	X	X	X	
MW-208	X	X	X	
MW-209	X	X	X	
MW-210	X	X	X	
MW-211	X	X	X	
MW-212	X	X	X	
MW-213	X	X	X	
MW-214	X	X	X	
MW-215	X	X	X	
MW-216	X	X	X	
MW-217	X	X	X	
MW-301	X	X		X
MW-401	X	X	X	
MW-402	X	X	X	
MW-403	X	X	X	
MW-405	X	X	X	
MW-406	X	X	X	
MW-A	X	X		X
MW-B	X	X		X
MW-C	X	X	X	
MW-D	X	X	X	
MW-E1	X	X	X	
MW-E2	X	X	X	
MW-F	X	X	X	
MW-G	X	X		X

* Samples were analyzed for VOCs, metals (total and dissolved phases), cyanide and water quality parameters as listed on Tables A2 and A3, Initial Parameter List, Yeoman Creek Landfill Superfund Site, Waukegan, Illinois.

** Samples were analyzed for the initial parameter list and water quality parameters as listed on Tables A2 and A3, Initial Parameter List, Yeoman Creek Landfill Superfund Site, Waukegan, Illinois.
Initial Parameter List provided by Geosyntec Consultants.

Table 1
Summary of Quarterly Monitoring - December 2003
Yeoman Creek Landfill
Waukegan, Illinois

Sample Description	Water Levels	Field Parameters	VOCs, Metals, Cyanide & WQ Parameters*	Initial Parameter List**
Leachate Monitoring Wells				
LW-101	X	X		X
LW-102	X	X		X
LW-103	X	X		X
Landfill Gas Probes				
LFG-101	X			
LFG-102	X			
LFG-103	X			
LFG-104	X			
LFG-105	X			
LFG-106	X			
LFG-107	X			
LFG-108	X			
LFG-109	X			
LFG-110	X			
LFG-111	X			
LFG-201	X			
LFG-202	X			
LFG-203	X			
LFG-204	X			
LFG-205	X			
LFG-206	X			
LFG-207	X			
LFG-208	X			
LFG-211	X			
LFG-216	X			
LFG-218	X			
LFG-219	X			
LFG-220	X			
LFG-221	X			
LFG-222	X			
LFG-223	X			
LFG-224	X			

* Samples were analyzed for VOCs, metals (total and dissolved phases), cyanide and water quality parameters as listed on Tables A2 and A3, Initial Parameter List, Yeoman Creek Landfill Superfund Site, Waukegan, Illinois.

** Samples were analyzed for the initial parameter list and water quality parameters as listed on Tables A2 and A3, Initial Parameter List, Yeoman Creek Landfill Superfund Site, Waukegan, Illinois.
Initial Parameter List provided by Geosyntec Consultants.

Table 2
Summary of Groundwater Elevations
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Location ID	Top of PVC* (MSL)	Total Well Depth* (feet)	Depth to Water 12-03 (feet)	Groundwater Elevation 12-03 (MSL)
Shallow Zone Wells				
<i>Lacustrine Clays, Organics, Sand Lenses</i>				
MW-204	662.45	22.67	16.96	645.49
MW-206	663.75	21.83	10.24	653.51
MW-208	659.31	21.31	10.76	648.55
MW-402	657.25	20.28	4.42	652.83
<i>Fluviolacustrine Sands</i>				
MW-102	653.53	23.77	7.84	645.69
MW-104	648.25	21.02	6.63	641.62
MW-106	654.96	20.26	6.99	647.97
MW-107	656.46	21.59	10.11	646.35
MW-108	654.59	25.22	8.55	646.04
MW-110	653.18	25.25	7.28	645.90
MW-111	655.64	25.27	9.43	646.21
MW-202	660.01	27.82	10.13	649.88
MW-210	651.81	26.15	5.02	646.79
MW-211	658.81	41.93	12.68	646.13
MW-212	658.87	18.79	12.75	646.12
MW-214	653.54	24.29	6.18	647.36
MW-215	654.80	20.27	6.33	648.47
MW-216	657.47	24.77	11.51	645.96
<i>Upper Outwash</i>				
MW-217	651.68	17.84	5.54	646.14
MW-406	661.19	32.91	18.68	642.51
MW-E1	664.75	33.81	21.94	642.81
MW-G	664.96	24.63	7.31	657.65

* - Top of PVC Elevations for groundwater wells provided by Parsons Engineering Sciences, Inc.
Water levels obtained on December 1, 2003.

Table 2
Summary of Groundwater Elevations
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Location ID	Top of PVC* (MSL)	Total Well Depth* (feet)	Depth to Water 12-03 (feet)	Groundwater Elevation 12-03 (MSL)
Lower Outwash Wells				
MW-101	653.63	40.25	7.63	646.00
MW-103	652.19	50.28	6.23	645.96
MW-105	654.79	45.37	8.46	646.33
MW-109	653.49	64.59	9.51	643.98
MW-112	649.45	39.87	5.36	644.09
MW-201	659.80	57.36	14.00	645.80
MW-203	663.00	68.51	20.25	642.75
MW-205	664.13	74.55	21.11	643.02
MW-207	658.50	47.02	15.24	643.26
MW-209	651.75	46.91	5.85	645.90
MW-213	653.89	47.11	7.98	645.91
MW-301	678.74	45.36	21.39	657.35
MW-401	657.53	60.77	14.61	642.92
MW-405	661.82	62.94	19.30	642.52
MW-A	655.54	50.18	9.29	646.25
MW-B	654.49	58.74	8.50	645.99
MW-C	655.31	49.51	11.32	643.99
MW-D	655.33	36.96	9.24	646.09
MW-E2	664.71	53.92	22.15	642.56
MW-F	660.30	43.27	17.83	642.47
Bedrock Well				
MW-403	657.63	174.75	91.17	566.46
Leachate Wells				
LW-101	655.70	15.09	9.01	646.69
LW-102	656.94	13.31	9.98	646.96
LW-103	654.93	15.11	6.92	648.01

* - Top of PVC Elevations for groundwater wells provided by Parsons Engineering Sciences, Inc.
Water levels obtained on December 1, 2003.

Table 2
Summary of Groundwater Elevations
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Location ID	Top of PVC* (MSL)	Total Well Depth* (feet)	Depth to Water 12-03 (feet)	Groundwater Elevation 12-03 (MSL)
Landfill Gas Probes				
LFG-101	652.77	10.03	8.87	643.90
LFG-102	654.01	10.13	6.73	647.28
LFG-103	655.37	10.13	9.39	645.98
LFG-104	654.23	10.15	9.12	645.11
LFG-105	654.55	8.85	REMOVED	
LFG-106	653.93	9.06	OBSTRUCTED	
LFG-107	652.64	5.54	7.68	644.96
LFG-108	654.44	9.24	DRY	<645.20
LFG-109	652.39	7.68	6.37	646.02
LFG-110	652.19	9.92	TEMPORARILY INACCESSIBLE	
LFG-111	654.01	10.22	9.19	644.82
LFG-201	660.68	8.24	DRY	<652.44
LFG-202	662.33	9.98	7.55	654.78
LFG-203	663.76	10.06	DRY	<653.70
LFG-204	658.34	10.33	6.82	651.52
LFG-205	656.72	10.28	8.63	648.09
LFG-206	659.46	10.35	DRY	<649.11
LFG-207	657.02	10.32	7.64	649.38
LFG-208	657.80	10.12	DRY	<647.68
LFG-211	660.81	7.48	6.41	654.40
LFG-216	656.62	10.20	6.02	650.60
LFG-218	662.19	6.73	DRY	<655.46
LFG-219	661.83	10.10	9.53	652.30
LFG-220	660.32	10.16	DRY	<650.16
LFG-221	660.04	10.21	DRY	<649.83
LFG-222	663.38	7.87	DRY	<655.51
LFG-223	660.83	9.82	8.85	651.98
LFG-224	665.28	9.97	DRY	<655.31

* - Top of PVC Elevations for groundwater wells provided by Parsons Engineering Sciences, Inc.
Water levels obtained on December 1, 2003.

Table 3
Summary of Analytical Results
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Parameter Name	Units	35 IAC 620.410 Class I Standard	Federal MCL	LW-101	LW-102	LW-103	MW-101	MW-103	MW-105	MW-109	MW-112	MW-201	MW-203	MW-205	MW-207	MW-209	MW-213	MW-301	MW-401	MW-403	MW-405	MW-A	MW-B	MW-C	MW-D	MW-E2	MW-F
				LE	LE	LE	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO
Water Quality Parameters																											
Dissolved Oxygen	mg/L	NA	NA	4.12	5.24	3.62	11.85	4.75	1.22	6.64	0.33	0.88	2.32	5.23	4.88	1.78	4.24	0.74	4.39	6.81	3.43	5.40	1.56	0.42	4.26	0.26	4.47
Ferrous Iron	ppm	NA	NA	12.49	51.52	74.40	2.50	0.57	4.61	2.64	0.68	2.46	0.42	4.14	2.41	8.56	1.90	0.74	18.92	1.36	0.46	2.41	0.56	4.50	3.35	0.07	5.84
pH	s.u.	6.5-9.0	NA	7.13	6.92	6.74	7.36	7.80	7.39	7.36	7.94	6.90	8.85	7.24	7.04	7.37	7.03	7.58	7.55	8.68	8.13	7.54	7.66	7.85	7.35	8.05	7.18
Redox Potential	mV	NA	NA	-106	-84	-110	-46	-20	-66	-64	-74	-28	-2	-93	-73	-84	-51	-7	-80	127	-1	52	-70	-72	-49	2	-56
Specific Conductivity	umhos	NA	NA	2100	3300	3900	2800	2000	1800	2000	1900	2200	620	2200	2300	1700	2300	540	1800	770	1800	1500	660	920	2400	760	2100
Temperature	deg. C	NA	NA	11.1	12.7	11.8	11.3	10.8	11.1	11.2	9.4	11.0	13.2	11.5	12.0	10.4	11.4	10.5	12.0	10.3	12.8	13.0	14.2	14.4	13.8	12.8	12.0
Turbidity	ntu	NA	NA	8.16	9.61	8.04	2.87	2.18	0.37	0.53	3.14	9.66	1.18	3.44	1.02	0.57	2.84	1.60	1.49	10.40	6.86	0.45	1.36	8.23	8.82	1.85	9.46
Chloride	mg/L	200	NA	65.3	138.0	208.0	476.0	186.0	205.0	198.0	275.0	370.0	3.4	220.0	154.0	260.0	271.0	20.7	120.0	23.2	247.0	195.0	1.7	13.8	338.0	51.9	207.0
Cyanide, total	mg/L	0.2	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrate	mg/L	10.00	10.00	<0.1	<0.1	<0.1	<0.1	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	1.90	<0.1	<0.1	<0.1	<0.1	<0.1	
Nitrite	mg/L	NA	1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Sulfate	mg/L	400	NA	7.3	28.2	<1	157.0	109.0	116.0	166.0	189.0	107.0	50.1	20.4	16.0	155.0	129.0	13.7	29.7	163.0	59.4	116.0	67.2	90.5	152.0	26.6	109.0
Sulfide	mg/L	NA	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Volatile Organic Compounds																											
1,1,2,2-Tetrachloroethane	ug/L	NA	NA	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dichlorobenzene	ug/L	600	600	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	ug/L	5	5	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethene	ug/L	70	70	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene	ug/L	75	75	8.9	1.6	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
2-Butanone	ug/L	NA	NA	<10	<10	<250	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
4-Methyl-2-Pentanone	ug/L	NA	NA	<10	<10	<250	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Acetone	ug/L	NA	NA	<10	<10	<250	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Benzene	ug/L	5	5	15	21	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	ug/L	NA	NA	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Chlorobenzene	ug/L	NA	100	26	2.5	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Chloroethane	ug/L	NA	NA	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Chloroform	ug/L	NA	NA	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Ethylbenzene	ug/L	700	700	<1	6.2	34	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Freon 113	ug/L	NA	NA	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Methylene chloride	ug/L	5	5	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Styrene	ug/L	100	100	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Tetrachloroethene	ug/L	5	5	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Toluene	ug/L	1000	1000	<1	<1	240	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Trichloroethene	ug/L	5	5	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Vinyl chloride	ug/L	2	2	<1	<1	<25	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Xylenes, total	ug/L	10000	10000	3.5	1.3	41	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Metals/Inorganics - Total																											
Aluminum, total	mg/L	NA	NA	0.71	1.80	0.64	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.30	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.34	<0.2	<0.2	<0.2	
Antimony, total	mg/L	0.006	0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Arsenic, total	mg/L	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Barium, total	mg/L	2	2	0.59	0.33	0.24	<0.																				

Table 3
Summary of Analytical Results
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Parameter Name	Units	35 IAC 620.410 Class I Standard	Federal MCL	LW-101	LW-102	LW-103	MW-101	MW-103	MW-105	MW-109	MW-112	MW-201	MW-203	MW-205	MW-207	MW-209	MW-213	MW-301	MW-401	MW-403	MW-405	MW-A	MW-B	MW-C	MW-D	MW-E2	MW-F
				LE	LE	LE	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO	LO
Metals - Dissolved																											
Aluminum, dissolved	mg/L	NA	NA	<0.2	<0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Antimony, dissolved	mg/L	0.006	0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic, dissolved	mg/L	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Barium, dissolved	mg/L	2.00	2.00	0.57	0.32	0.24	<0.2	<0.2	0.20	<0.2	<0.2	0.31	<0.2	0.69	0.32	<0.2	<0.2	<0.2	0.60	<0.2	0.31	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	mg/L	0.004	0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Boron, dissolved	mg/L	2.00	NA	0.70	0.83	1.00	<0.2	0.25	0.35	0.31	<0.2	0.22	0.33	0.57	<0.2	0.39	<0.2	0.51	0.86	0.21	0.24	0.41	0.26	<0.2	0.24	0.39	
Cadmium, dissolved	mg/L	0.005	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Calcium, dissolved	mg/L	NA	NA	145.0	159.0	228.0	158.0	133.0	128.0	119.0	136.0	143.0	30.3	160.0	147.0	187.0	165.0	49.1	106.0	15.4	130.0	108.0	44.4	66.0	171.0	47.4	129.0
Chromium, dissolved	mg/L	0.1000	0.1000	<0.005	<0.005	0.0180	0.0086	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Cobalt, dissolved	mg/L	1	NA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Copper, dissolved	mg/L	0.65	1.3	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Iron, dissolved	mg/L	5.0	NA	19.8	8.8	35.4	3.7	3.0	4.6	2.9	3.4	3.8	<0.1	4.2	2.5	9.1	6.1	0.7	5.3	0.2	<0.1	<0.1	0.5	0.9	3.3	<0.1	4.7
Lead, dissolved	mg/L	0.0075	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
Magnesium, dissolved	mg/L	NA	NA	59.4	116.0	116.0	82.2	71.0	82.0	102.0	71.7	58.1	45.8	108.0	82.4	77.0	57.2	34.2	58.4	8.4	95.0	73.3	39.8	69.0	66.6	41.0	92.30
Manganese, dissolved	mg/L	0.15	NA	0.210	0.480	0.400	0.061	0.027	0.029	0.022	0.083	0.140	<0.015	0.018	0.037	0.090	0.240	0.060	0.038	<0.015	0.110	<0.015	0.015	0.018	0.210	<0.015	0.045
Mercury, dissolved	mg/L	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Nickel, dissolved	mg/L	0.1	NA	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.22	<0.04	<0.04	0.26	<0.04	<0.04	<0.04	<0.04	<0.04	
Potassium, dissolved	mg/L	NA	NA	14.3	70.9	41.0	<5	19.1	13.6	<5	<5	5.6	<5	30.8	<5	6.8	<5	35.3	<5	12.9	<5	<5	<5	<5	<5	15.6	
Selenium, dissolved	mg/L	0.05	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Sodium, dissolved	mg/L	NA	NA	27.0	127.0	169.0	190.0	105.0	91.1	98.5	127.0	216.0	31.0	105.0	76.2	78.7	137.0	26.0	84.1	108.0	92.1	59.2	38.8	27.3	176.0	61.9	89.1
Vanadium, dissolved	mg/L	NA	NA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Zinc, dissolved	mg/L	5	NA	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.044	0.54	<0.02	<0.02	<0.02	0.045	<0.02	<0.02
Semi-Volatile Organic Compounds																											
2,4-Dimethylphenol	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
2-Chlorophenol	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
2-Methylnaphthalene	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
2-Methylphenol	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
4-Chloro-3-Methylphenol	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
3- & 4-Methylphenol	ug/L	NA	NA	<10	<100	240	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
4-Nitrophenol	ug/L	NA	NA	<50	<500	<500	<50	<50	<50	<50	<50	--	--	--	--	--	--	<50	--	--	--	<50	<50	--	--	--	--
Acenaphthene	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
Acenaphthylene	ug/L	NA	NA	<10	<100	<100	<10	<10	<10	<10	<10	--	--	--	--	--	--	<10	--	--	--	<10	<10	--	--	--	--
Anthracene	ug/L	NA																									

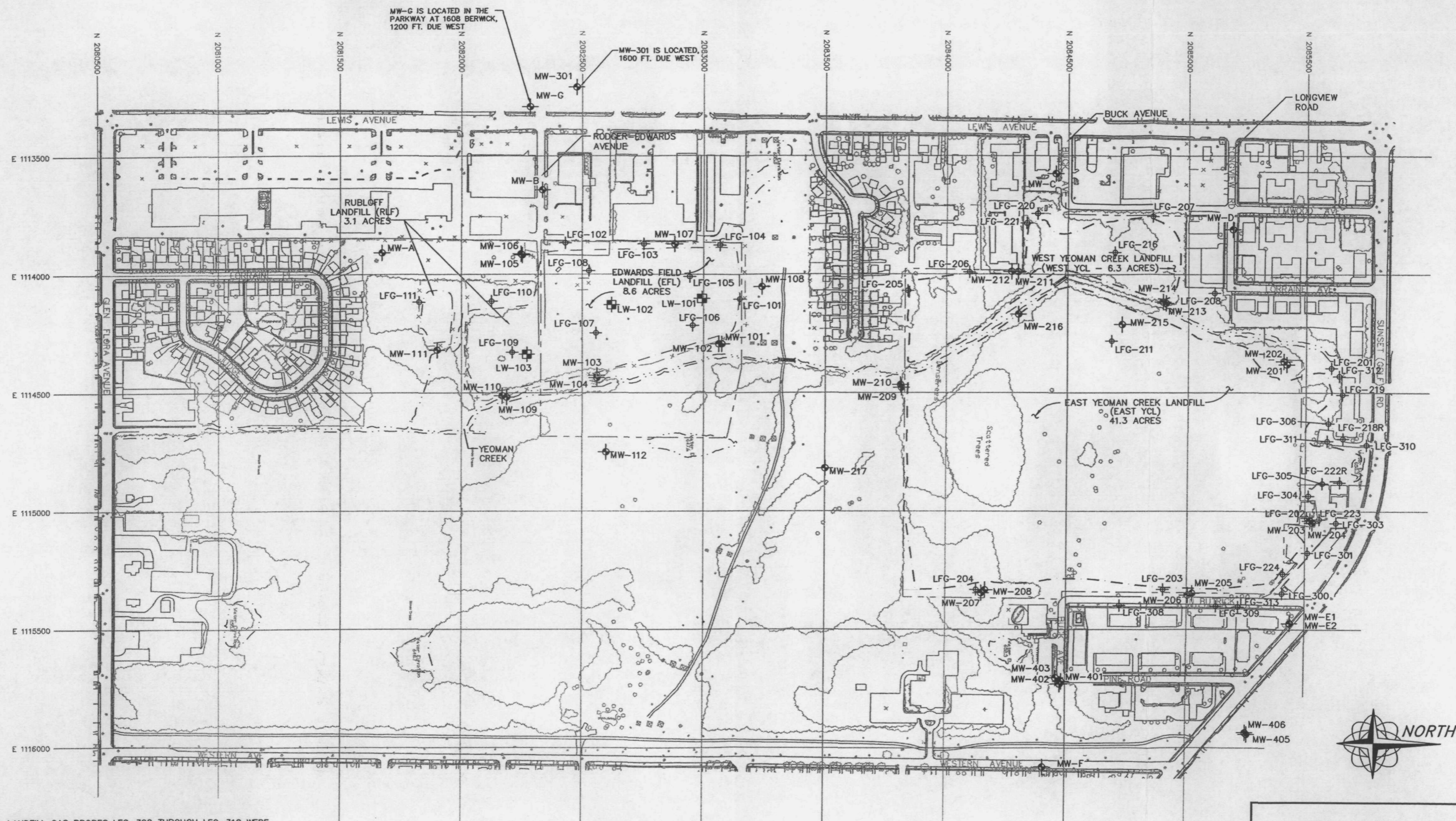
Table 3
Summary of Analytical Results
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Parameter Name	Units	35 IAC 620.410 Class I Standard	Federal MCL	MW-102	MW-104	MW-106	MW-107	MW-108	MW-110	MW-111	MW-202	MW-204	MW-206	MW-208	MW-210	MW-211	MW-212	MW-214	MW-215	MW-216	MW-217	MW-402	MW-406	MW-E1	MW-G	
				SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ
Water Quality Parameters																										
Dissolved Oxygen	mg/L	NA	NA	1.79	0.77	0.14	0.55	1.43	0.48	5.17	0.45	8.77	0.23	0.15	0.16	0.35	7.87	0.00	6.36	0.32	0.00	0.45	4.38	5.83	4.32	
Ferrous Iron	ppm	NA	NA	9.36	0.16	12.16	3.66	1.30	9.24	11.84	8.48	0.67	1.77	12.34	4.82	11.92	9.98	0.27	4.52	5.56	6.32	2.18	3.17	4.19	2.54	
pH	s.u.	6.5-9.0	NA	7.42	7.46	7.18	7.31	7.67	7.45	6.99	7.22	7.78	8.06	7.40	7.40	7.22	6.79	7.91	6.87	7.32	8.35	7.35	7.00	7.01	7.51	
Redox Potential	mV	NA	NA	-72	-70	-65	-59	-45	-56	-91	-61	-80	-89	-54	-38	-69	-87	-81	-99	-49	-146	-67	-42	-48	-75.00	
Specific Conductivity	umhos	NA	NA	2600	3300	2400	1400	910	2000	2500	6500	2600	2700	1900	2100	2000	1300	1600	830	1700	1100	3100	2800	2900	750	
Temperature	deg. C	NA	NA	11.9	10.9	11.3	12.6	11.3	11.6	11.9	11.6	13.9	13.3	12.0	10.7	14.5	16.4	11.1	11.3	12.4	9.3	12.0	12.8	13.3	13.3	
Turbidity	ntu	NA	NA	5.58	1.59	6.88	1.51	1.38	1.85	4.10	1.57	2.18	3.03	3.16	2.03	0.51	3.64	0.96	1.74	5.30	34.10	1.14	123.00	3.75	9.63	
Chloride	mg/L	200	NA	478	239.0	184.0	9.0	41.4	183.0	178.0	1250.0	205.0	138.0	31.7	171.0	198.0	24.8	191.0	924.0	88.1	88.4	432.0	265.0	361.0	4.4	
Cyanide, total	mg/L	0.2	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Nitrate	mg/L	10.00	10.00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.32	<0.1	<0.1	<0.1	
Nitrite	mg/L	NA	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2*	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Sulfate	mg/L	400	NA	348.0	1.2	296.0	252.0	75.8	81.2	56.8	30.1	178.0	205.0	584.0	402.0	79.9	13.2	13.6	<1	52.8	62.2	484.0	75.1	116.0	65.2	
Sulfide	mg/L	NA	NA	<1	<1	<1	<1	<1	<1	<1	2.60	<1	<1	<1	<1	<1	<1	1.20	<1	<1	<1	<1	<1	<1	<1	
Volatile Organic Compounds																										
1,1,2,2-Tetrachloroethane	ug/L	NA	NA	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
1,2-Dichlorobenzene	ug/L	600	600	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethane	ug/L	5	5	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	2.2	38	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
1,2-Dichloroethene	ug/L	70	70	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	38	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene	ug/L	75	75	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
2-Butanone	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	<20*	<10	<10	<10	<10	<10	<10	<10	<3.3	<10	<10	<10	<10	<10	<10	
4-Methyl-2-Pentanone	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	<20*	<10	<10	<10	<10	<10	<10	<10	<3.3	<10	<10	<10	<10	<10	<10	
Acetone	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	<20*	<10	<10	<10	<10	<10	<10	<10	<3.3	<10	<10	<10	<10	<10	<10	
Benzene	ug/L	5	5	<1	<1	<1	<1	<1	<1	<1	<2*	<1	1.4	1.7	<1	1.1	1.6	<1	12	<1	<1	<1	<1	<1	<1	
Bromodichloromethane	ug/L	NA	NA	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Chlorobenzene	ug/L	NA	100	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	9.8	<1	<1	1.2	<1	<3.3	<1	<1	<1	<1	<1	<1	
Chloroethane	ug/L	NA	NA	<1	1.4	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Chloroform	ug/L	NA	NA	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Ethylbenzene	ug/L	700	700	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Freon 113	ug/L	NA	NA	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Methylene chloride	ug/L	5	5	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Styrene	ug/L	100	100	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Tetrachloroethene	ug/L	5	5	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Toluene	ug/L	1000	1000	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Trichloroethene	ug/L	5	5	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	<3.3	<1	<1	<1	<1	<1	<1	
Vinyl chloride	ug/L	2	2	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	27	<1	<1	<1	<3.3	3.7	<1	<1	<1	<1	<1	
Xylenes, total	ug/L	10000	10000	<1	<1	<1	<1	<1	<1	<1	<2*	<1	<1	<1	<1	<1	<1	<1	36	<1	<1	<1	<1	<1	<1	
Metals/Inorganics - Total																										
Aluminum, total	mg/L	NA	NA	0.31	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.46	<0.2	<0.2	<0.2	8.80	<0.2	<0.2	
Antimony, total	mg/L	0.006	0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Arsenic, total	mg/L	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.28	0.049	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Barium, total	mg/L	2	2	<0.2	0.66	0.26	<0.2	<0.2	0.47	0.7	<0.2	0.21	<0.2	<0.2	0.34	<0.2	0.29	0.38	0.25	<0.2	<0.2	1	0.64	<0.2	<0.2	
Beryllium, total	mg/L	0.004	0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Boron, total	mg/L	2	NA	0.21	1.1	0.27	0.24	0.21	0.48	0.56	0.72	<0.2	15	0.31	<0.2	0.28	<0.2	0.65	<0							

Table 3
Summary of Analytical Results
December 2003 Groundwater Monitoring Event
Yeoman Creek Landfill
Waukegan, Illinois

Parameter Name	Units	35 IAC 620.410 Class I Standard	Federal MCL	MW-102	MW-104	MW-106	MW-107	MW-108	MW-110	MW-111	MW-202	MW-204	MW-206	MW-208	MW-210	MW-211	MW-212	MW-214	MW-215	MW-216	MW-217	MW-402	MW-406	MW-E1	MW-G	
				SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ	SZ
Metals - Dissolved																										
Aluminum, dissolved	mg/L	NA	NA	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Antimony, dissolved	mg/L	0.006	0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Arsenic, dissolved	mg/L	0.05	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.25	0.039	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Barium, dissolved	mg/L	2.00	2.00	<0.2	0.69	0.26	<0.2	<0.2	<0.2	0.45	0.82	<0.2	0.22	<0.2	0.38	<0.2	0.28	0.33	0.25	<0.2	0.23	0.90	0.65	<0.2	<0.2	
Beryllium, dissolved	mg/L	0.004	0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Boron, dissolved	mg/L	2.00	NA	0.20	1.10	0.27	0.20	0.21	0.45	0.53	0.58	<0.2	18.70	0.30	<0.2	0.32	<0.2	<0.2	0.61	0.20	<0.2	5.00	0.59	0.65	<0.2	
Cadmium, dissolved	mg/L	0.005	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
Calcium, dissolved	mg/L	NA	NA	220.0	62.5	271.0	175.0	83.0	126.0	198.0	409.0	40.4	157.0	203.0	239.0	160.0	120.0	145.0	322.0	186.0	121.0	329.0	173.0	187.0	74.7	
Chromium, dissolved	mg/L	0.1000	0.1000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Cobalt, dissolved	mg/L	1	NA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Copper, dissolved	mg/L	0.65	1.3	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025		
Iron, dissolved	mg/L	5.0	NA	12.9	6.7	19.8	3.5	2.2	4.9	11.4	9.6	1.0	1.9	24.1	8.3	11.7	20.2	0.4	5.6	16.1	7.5	1.9	4.8	4.2	1.4	
Lead, dissolved	mg/L	0.0075	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		
Magnesium, dissolved	mg/L	NA	NA	54.5	83.1	100.0	56.4	47.0	81.8	99.3	280.0	157.0	139.0	109.0	110.0	87.4	42.3	71.2	138.0	73.5	48.7	87.9	88.3	98.7	45.8	
Manganese, dissolved	mg/L	0.15	NA	0.270	0.035	0.380	0.360	0.100	0.026	0.100	0.480	0.023	0.200	0.460	0.250	0.130	0.240	0.110	0.240	0.220	0.530	0.950	0.110	0.086	0.025	
Mercury, dissolved	mg/L	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Nickel, dissolved	mg/L	0.1	NA	<0.04	<0.04	<0.04	<0.04	0.29	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04		
Potassium, dissolved	mg/L	NA	NA	<5	102.0	5.9	9.4	<5	17.8	12.0	34.4	8.7	46.0	12.6	5.7	19.3	<5	<5	169.0	8.8	<5	11.9	29.7	23.4	<5	
Selenium, dissolved	mg/L	0.05	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Sodium, dissolved	mg/L	NA	NA	220.0	245.0	73.2	17.2	34.6	115.0	125.0	620.0	233.0	134.0	20.0	68.9	90.9	17.4	72.1	845.0	46.1	86.9	193.0	146.0	160.0	12.3	
Vanadium, dissolved	mg/L	NA	NA	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Zinc, dissolved	mg/L	5	NA	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
Semi-Volatile Organic Compounds																										
2,4-Dimethylphenol	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
2-Chlorophenol	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
2-Methylnaphthalene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
2-Methylphenol	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
4-Chloro-3-Methylphenol	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
3- & 4-Methylphenol	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
4-Nitrophenol	ug/L	NA	NA	<50	<50	<50	<50	<50	<50	<50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<50	
Acenaphthene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Acenaphthylene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Anthracene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Benzo(a)anthracene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Benzo(a)pyrene	ug/L	0.2	0.2	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Benzo(b)fluoranthene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Benzo(g,h,i)perylene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
Benzo(k)fluoranthene	ug/L	NA	NA	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<10	
</																										

Figures



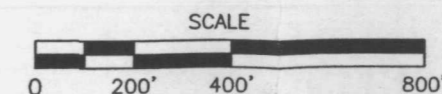
NOTE: LANDFILL GAS PROBES LFG-300 THROUGH LFG-310 WERE ADDED PURSUANT TO 3/4/04 EMAIL FROM JOHN SEYMOUR OF GEOSYNTEC. LOCATIONS ARE BASED ON ATTACHMENT TO THE 3/4/04 EMAIL. ALSO, LOCATION OF LFG-313 BASED ON VERBAL COMMUNICATION WITH CLIFF YANTZ OF GEOSYNTEC.

NOTE: LEACHATE WELL LW-201, LW-202, LW-203, AND LW-204 WERE DECOMMISSIONED PRIOR TO THE JUNE 2002 EVENT.

NOTE: DRAWING ADAPTED FROM DRAWING NO. 2 OF 29 FROM GEOSYNTEC CONSULTANTS, JOB No. 000864-8.4, DATED APRIL 27, 2001 (REMEDIAL DESIGN, YEOMAN CREEK LANDFILL SUPERFUND SITE, WAUKEGAN, ILLINOIS).

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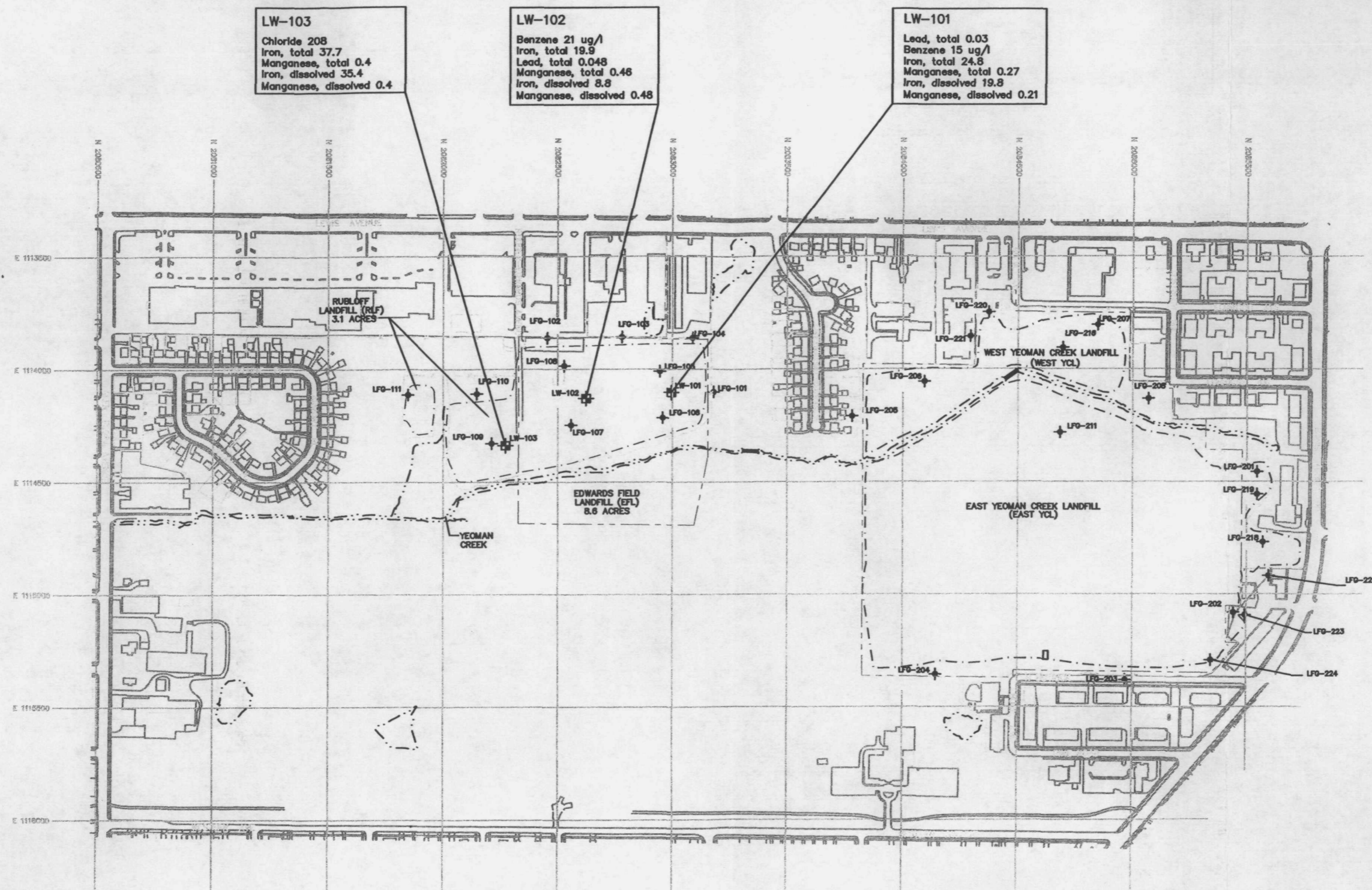
- LEGEND
- | | | | |
|-----|-----------------------------|-----------|--------------------|
| --- | APPROXIMATE LIMIT OF WASTE | --- | TREE LINE |
| --- | APPROXIMATE PROPERTY LINE | --- | EXISTING ROAD |
| ● | GROUNDWATER MONITORING WELL | ○ | EXISTING TREE |
| ■ | LEACHATE WELL | □ | HOUSE OR STRUCTURE |
| + | GAS PROBE | --- | SIDEWALK |
| --- | SURFACE WATER | - x - x - | EXISTING FENCE |



MONITORING POINT LOCATIONS

YEOMAN CREEK LANDFILL
WAUKEGAN, ILLINOIS

Weaver Boos Consultants, Inc.		
GRIFITH, IN FORT WORTH, TX	CHICAGO, IL (312) 922-1030	DOWNERS GROVE, IL SPRINGFIELD, IL
DRAWN BY: RAK	DATE: 03/08/04	FILE: 0081-300-04
REVIEWED BY: AMP	CAD: LOCATIONS.DWG	FIGURE 1



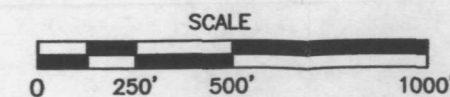
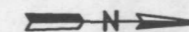
NOTES:
 ALL ANALYTICAL RESULTS ARE REPORTED IN MG/L UNLESS OTHERWISE NOTED.

NOTE: LEACHATE WELL LW-201, LW-202, LW-203, AND LW-204 WERE DECOMMISSIONED PRIOR TO THE JUNE 2002 EVENT.

NOTE: DRAWING ADAPTED FROM DRAWING NO. 2 OF 29 FROM GEOSYNTEC CONSULTANTS, JOB No. 000864-8.4, DATED APRIL 27, 2001 (REMEDIAL DESIGN, YEOMAN CREEK LANDFILL SUPERFUND SITE, WAUKEGAN, ILLINOIS).
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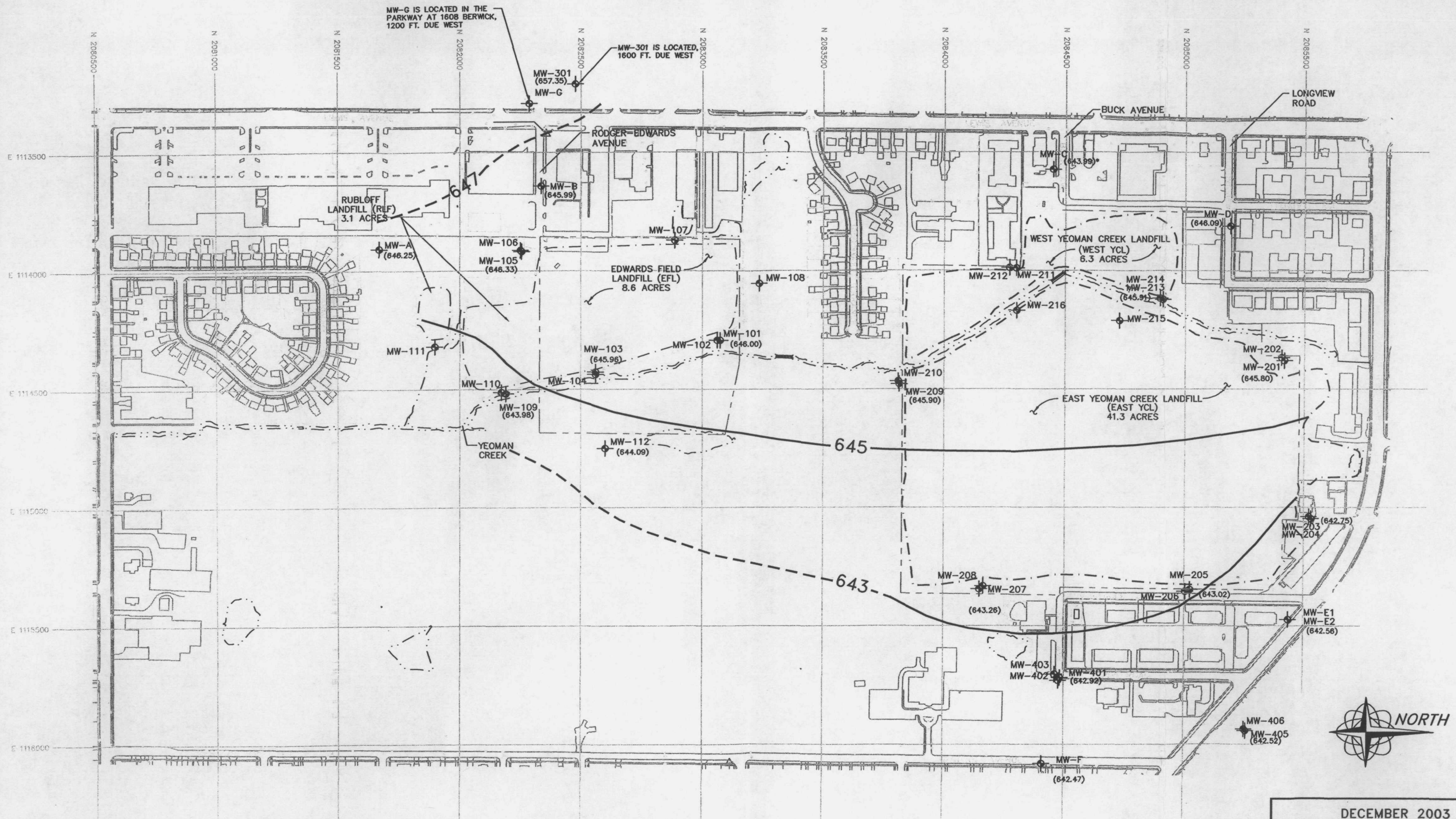
LEGEND

- | | | | |
|-----------|----------------------------|---|--------------------|
| —550— | EXISTING GROUND ELEVATION | — | EXISTING ROAD |
| - - - - - | APPROXIMATE LIMIT OF WASTE | □ | HOUSE OR STRUCTURE |
| - - - - - | APPROXIMATE PROPERTY LINE | — | SIDEWALK |
| + | LEACHATE WELL | — | EXISTING FENCE |
| + | GAS PROBE | | |



DECEMBER 2003
 IAC 620.410
 LEACHATE EXCEEDENCES
 YEOMAN CREEK LANDFILL
 WAUKEGAN, ILLINOIS

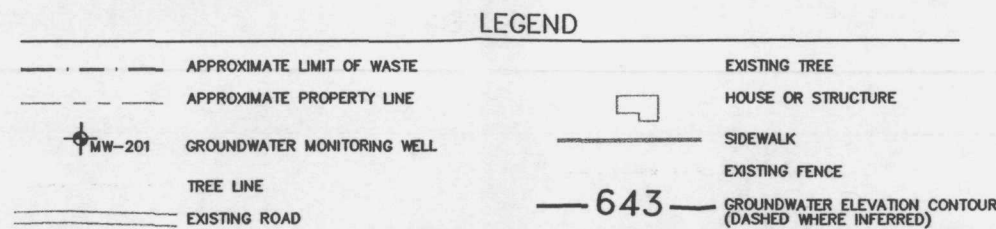
Weaver Boos Consultants, Inc.
 GRIFFITH, IN FORT WORTH, TX
 CHICAGO, IL (312) 922-1030
 DOWNERS GROVE, IL SPRINGFIELD, IL
 DRAWN BY: JCO/RAK DATE: 02/03/04 FILE: 0081300-04
 REVIEWED BY: JR CAD:1203LEACH_EXCEED.DWG **FIGURE 3**



NOTE: DRAWING ADAPTED FROM DRAWING NO. 2 OF 29 FROM GEOSYNTEC CONSULTANTS, JOB No. 000864-8.4, DATED APRIL 27, 2001 (REMEDIAL DESIGN, YEOMAN CREEK LANDFILL SUPERFUND SITE, WAUKEGAN, ILLINOIS).

* GROUNDWATER ELEVATION FOR MW-C APPEARS TO BE ANOMALOUSLY LOW IN RELATION TO SURROUNDING DATA, THEREFORE IT WAS NOT UTILIZED WHEN CREATING THIS POTENTIOMETRIC SURFACE MAP.

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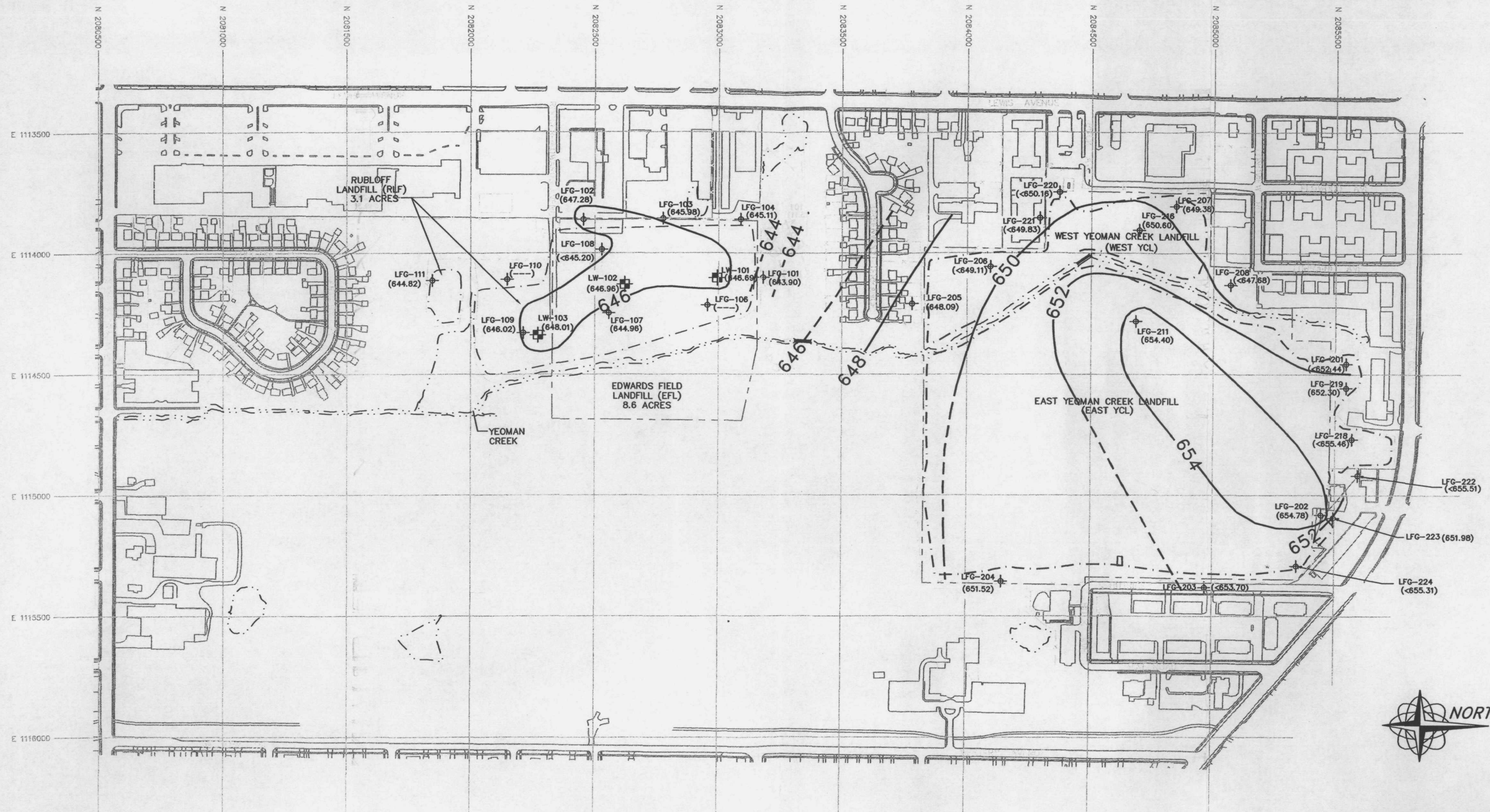
**DECEMBER 2003
POTENTIOMETRIC SURFACE MAP
FOR LOWER OUTWASH WELLS**

**YEOMAN CREEK LANDFILL
WAUKEGAN, ILLINOIS**

Weaver Boos Consultants, Inc.

GRIFITH, IN CHICAGO, IL DOWNERS GROVE, IL
FORT WORTH, TX (312) 922-1030 SPRINGFIELD, IL

DRAWN BY: CB/RAK	DATE: 01/22/04	FILE: 0081-300-04
REVIEWED BY: JR	CAD: 1203POT.DWG	FIGURE 4



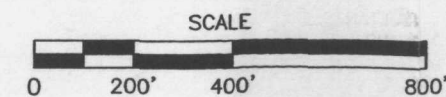
NOTES

- 1.) LEACHATE WELLS LW-201, LW-202, LW-203, AND LW-204 WERE DECOMMISSIONED PRIOR TO THE JUNE 2002 EVENT.
- 2.) DRAWING ADAPTED FROM DRAWING NO. 2 OF 29 FROM GEOSYNTEC CONSULTANTS, JOB No. 000864-8.4, DATED APRIL 27, 2001 (REMEDIAL DESIGN, YEOMAN CREEK LANDFILL SUPERFUND SITE, WAUKEGAN, ILLINOIS).
- 3.) DRY WELLS ARE SHOWN WITH ELEVATIONS < THE BOTTOM OF THE WELL.
- 4.) UNABLE TO OBTAIN LEACHATE LEVEL FROM LFG-106 AS THIS GAS PROBE HAS BEEN DAMAGED, AND LFG-110 AS THIS PROBE IS LOCATED UNDER A TIRE CHIP PILE.

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LEGEND

— 650 —	EXISTING GROUND ELEVATION	— — —	EXISTING ROAD
- - - - -	APPROXIMATE LIMIT OF WASTE	□	HOUSE OR STRUCTURE
- - - - -	APPROXIMATE PROPERTY LINE	— — —	SIDEWALK
- 646 -	LEACHATE CONTOUR (DASHED WHERE INFERRED)	— — —	EXISTING FENCE
⊕ LW-201	LEACHATE WELL		
⊕ LFG-109	GAS PROBE		



DECEMBER 2003 POTENTIOMETRIC SURFACE MAP FOR LEACHATE WELLS

YEOMAN CREEK LANDFILL
WAUKEGAN, ILLINOIS

Weaver Boos Consultants, Inc.

GRIFITH, IN CHICAGO, IL DOWNERS GROVE, IL
FORT WORTH, TX (312) 922-1030 SPRINGFIELD, IL

DRAWN BY: CB/RAK DATE: 01/22/04 FILE: 0081-300-04

REVIEWED BY: JR CAD:1203LEACHATE.DWG **FIGURE 5**

Attachment 1
Data Validation Report



Exponent
4000 Kruse Way Place
Building 2, Suite 285
Lake Oswego, OR 97035

telephone 503-636-4338
facsimile 503-636-4315
www.exponent.com

February 5, 2004

Amy Powers
Weaver Boos Consultants, Inc.
200 South Michigan Avenue, Suite 900
Chicago, Illinois 60604

Subject: Data Validation Report for Yeoman Creek Landfill Superfund Site: December 2003
Sampling Event
Exponent Contract No. 8601524.001 0701

Dear Amy:

This letter documents the results of a quality assurance review of data reported for the analysis of organic and inorganic compounds that were collected during the December 2003 sampling event at the Yeoman Creek Landfill Superfund Site located in Waukegan, Lake County, Illinois. Analyses were completed on five unfiltered water samples and five filtered water samples (metals only). Two data packages were submitted to Exponent® for validation in work orders A3L060142 and A3L100234. Overall, the data reported are of good quality and no results required qualification as estimated (*J*), restatement as undetected (*U*), or rejection (*R*).

The quality assurance review was conducted to verify that the laboratory quality assurance and quality control procedures were documented, and included evaluating the applicable quality control results reported by the laboratory. The adequacy of the sampling procedures was not assessed. A summary of the overall quality of the analytical results, data validation procedures, and the analytical methods used to complete the analyses used to complete the analyses is presented below. The results for all analyses completed are included in the attached CD-ROM.

Overall Quality of the Analytical Results

The results for all applicable quality control procedures employed by the laboratory during analysis of the samples were generally acceptable. No sample results required qualification as estimated (*J*), restatement as undetected (*U*), or rejection (*R*).

In some instances, method-specific quality control criteria were not met, as identified during the quality assurance review.

The criteria that were not met included the following:

- For the analysis of volatile organic compounds (VOCs), the 25 percent difference continuing calibration control limit was not met for acetone. The difference between the relative response factor (RRF) of the continuing calibration verification (CCV) standard and the average RRF from the initial calibration for acetone was 27.5 percent. No action was taken because the alternative method criterion (taking the overall average of the RRFs) was less than 25 percent.
- For the analysis of semivolatile organic compounds (SVOCs), the laboratory should have reported results for 4-methylphenol as 3- and 4-methylphenol because separation of these two SVOCs cannot be accomplished by the analytical method used. This was corrected in the database on the attached CD-ROM.
- For the analysis of organochlorine pesticides, the 15-percent continuing calibration control limit was not met in five instances. In one continuing calibration, differences of 22.0 percent and 29.4 percent were reported for 4,4'-DDD and methoxychlor, respectively, on one column, and 16.3 percent, 16.6 percent, and 27.6 percent for beta BHC, 4,4'-DDD, and methoxychlor, respectively, on the confirmation column. No action was taken because the exceedances were due to an increase in instrument sensitivity and these target analytes were not detected in the associated samples. Therefore, false negatives were not reported and the reporting limits were not compromised.

Data Validation Procedures

Data validation procedures included evaluating the sample results and applicable quality control results reported by the laboratory. The data were validated in accordance with guidance specified by the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (U.S. EPA 1999) for organic analyses and the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (U.S. EPA 2002) for metals and cyanide, as specified in the project quality assurance project plan (WBG 1999).

The following laboratory deliverables were reviewed during data validation:

- The case narrative discussing analytical problems (if any) and procedures
- Chain-of-custody documentation to verify completeness of the data set
- Sample preparation logs or laboratory summary result forms to verify analytical holding time constraints were met

- Results for instrument tuning (VOC and SVOC analyses) and initial and continuing calibration results to assess instrument performance
- Results for method blanks and the trip blank to determine whether an analyte reported as detected in any sample was the result of possible contamination at the laboratory or contamination during transport of samples
- Results for internal standards performance (VOC and SVOC analyses) to ensure that instrument sensitivity and response were stable during the analysis of the samples
- Results for applicable surrogate compound, laboratory control sample (LCS) (i.e., blank spikes) and duplicate LCS, and matrix spike/matrix spike duplicate (MS/MSD) recoveries to assess analytical accuracy
- Results for laboratory duplicate sample, duplicate LCS results, and/or MSD analyses, as applicable, to assess analytical precision
- Instrument printouts (e.g., chromatograms, mass spectra, and quantification reports) to assess the validity of analyte identification as either detected or undetected and to verify quantification of sample results
- Laboratory summaries of analytical results.

Analytical Methods

Analyses were completed by Severn Trent Laboratories, Inc., North Canton, Ohio according to the following procedures:

- VOCs (22 target analytes) on five samples by purge and trap and analysis by gas chromatography/mass spectrometry (GC/MS) using U.S. EPA SW-846 Method 8260B (U.S. EPA 1997)
- Total and dissolved metals (21 target analytes) on five samples by digestion and analysis by inductively coupled plasma-atomic emission spectrometry (ICP-AES) using U.S. EPA SW-846 Method 6010B (U.S. EPA 1997) and mercury by digestion and analysis by cold vapor atomic absorption (CVAA) using U.S. EPA SW-846 Method 7470A (U.S. EPA 1997)
- Cyanide on five samples by reflux distillation and colorimetric detection using U.S. EPA SW-846 Method 9012A (U.S. EPA 1997)
- SVOCs (35 target analytes) on two samples by extraction and analysis by GC/MS using U.S. EPA SW-846 Method 8270C (U.S. EPA 1997)
- Nitrate-nitrogen, nitrite-nitrogen, chloride, and sulfate on five samples by ion chromatography using U.S. EPA Method 300.0 (U.S. EPA 1993)

Amy Powers
February 5, 2004
Page 4

- Acid-soluble sulfide on five samples by distillation and titration using U.S. EPA SW-846 Method 9030B/9034 (U.S. EPA 1997)
- Organochlorine pesticides (8 target analytes) on two samples by extraction and analysis by gas chromatography/electron capture detection (GC/ECD) using U.S. EPA SW-846 Method 8081 (U.S. EPA 1997)
- Polychlorinated biphenyls (5 target analytes) on two samples by extraction and analysis by GC/ECD using U.S. EPA SW-846 Method 8082 (U.S. EPA 1997).

Should you have any questions regarding the information presented herein, please call me at (503) 636-4338.

Cordially,



James J. Mc Ateer, Jr.
Project Manager

Enclosure

cc: Mike Maxwell, Weaver Boos Consultants, Inc. (letter only)

References

U.S. EPA. 1993. Methods for the determination of inorganic substances in environmental samples. EPA/600/R-93/100. August 1993. Office of Research and Development. U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA. 1997. Test methods for evaluating solid waste. SW-846. Version 2.0. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA. 1999. USEPA Contract Laboratory Program national functional guidelines for organic data review. EPA/540/R-99/008. October 1999. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC.

U.S. EPA. 2002. USEPA Contract Laboratory Program national functional guidelines for inorganic data review. EPA 540-R-01-008. July 2002. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC.

WBG. 1999. Pre-design data collection work plan, Appendix B: quality assurance project plan for Yeoman Creek Landfill Superfund Site. Revision II, revised August 1999. Prepared by Parsons Engineering Science, Inc., Oak Brook, IL. Prepared for Weaver Boos & Gordon, Chicago, IL.

Attachment 2
Case Narratives

CASE NARRATIVE

A3L090190

The following report contains the analytical results for twenty-four water samples submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 09, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 24, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the coolers upon sample receipt was 1.1, 2.8 and 2.3°C.

See STL's Cooler Receipt Form for additional information.

GC/MS SEMIVOLATILES

The analytical results met the requirements of the laboratory's QA/QC program.

PESTICIDES-8081

The analytical results met the requirements of the laboratory's QA/QC program.

CASE NARRATIVE (continued)

POLYCHLORINATED BIPHENYLS-8082

For sample 031208-JR-EFL-GW-U-MW112 and the LCSD in batch 3343456 the recovery for one of two surrogate compounds is outside acceptance criteria, so no corrective action was required.

METALS

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031208-JR-YCL-GW-U-MWF and 031208-JR-YCL-GW-F-MWF due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(s) 3344105 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

No ICP Trace Form IX was provided for batch 3344105. The serial dilution was performed on a different sample from the same QC batch(es).

GENERAL CHEMISTRY

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(s) 3349262 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for 031208-JR-YCL-GW-U-MWF had RPD's and/or recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

CASE NARRATIVE

A3L100191

The following report contains the analytical results for fourteen water samples submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 10, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 23, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the coolers upon sample receipt was 4.0, 1.3 and 1.8°C.

See STL's Cooler Receipt Form for additional information.

GC/MS SEMIVOLATILES

Sample 031209-JR-EFL-GW-U-LW102 had elevated reporting limits due to TICs.

CASE NARRATIVE (continued)

PESTICIDES-8081

The analyses reported herein were performed using an instrument that has two columns(GC) or detectors(HPLC), one of which is used to confirm the results of the other. Peak interferences may result in some cases, which cause a quantitation difference between the two columns/detectors. If the difference between the two results is greater than 40%, the higher of the two results or the primary column/detector is normally reported. The reported results are flagged with "PG".

POLYCHLORINATED BIPHENYLS-8082

The reporting limits are elevated due to matrix interference for samples 031209-JR-EFL-GW-U-LW101, 031209-JR-EFL-GW-U-LW102 and 031209-JR-EFL-GW-U-LW103.

METALS

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes flagged with "E".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031209-JR-EFL-GW-U-MW217 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

GENERAL CHEMISTRY

The sample(s) had elevated reporting limits due to matrix interferences. Refer to the sample report pages for the affected analyte(s) flagged with "G".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(s) 3345273 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

CASE NARRATIVE

A3L100238

The following report contains the analytical results for forty-six water samples and one quality control sample submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 10, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 21, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the coolers upon sample receipt was 4.0, 1.3 and 1.8°C.

GC/MS VOLATILES

Samples 031204-JR-YCL-GW-U-MW215, 031204-JR-YCL-GW-U-MW715 and 031204-MC-YCL-GW-U-MW202 had elevated reporting limits due to matrix interference.

The pH of the samples 031204-JR-YCL-GW-U-MW215 and 031204-JR-YCL-GW-U-MW715 was greater than 2. The sample(s) was analyzed within the normal 14 day holding time; however, experimental evidence suggests that some aromatic compounds in wastewater samples, notably Benzene, Toluene, and Ethylbenzene are susceptible to biological degradation if samples are not preserved to a pH of 2.

CASE NARRATIVE

A3L040230

The following report contains the analytical results for sixteen water samples submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 04, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 22, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the coolers upon sample receipt was 1.4, 2.6, 1.7 and 1.9°C.

See STL's Cooler Receipt Form for additional information.

GC/MS SEMIVOLATILES

The analytical results met the requirements of the laboratory's QA/QC program.

PESTICIDES-8081

The analytical results met the requirements of the laboratory's QA/QC program.

CASE NARRATIVE (continued)

POLYCHLORINATED BIPHENYLS-8082

For samples 031203-JR-EFL-GW-U-MW106, 031203-JR-EFL-GW-U-MW606, 031203-JR-EFL-GW-U-MW107, 031203-JR-EFL-GW-U-MW108, 031203-JR-ELF-GW-U-MW102 and 031203-JR-EFL-GW-U-MW110 the recovery for one of two surrogate compounds is outside acceptance criteria, so no corrective action was required.

METALS

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031203-JR-ELF-GW-U-MW101 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The MS/MSD(s) for 031203-JR-ELF-GW-U-MW101 and 031203-JR-ELF-GW-F-MW101 had RPD's and/or recoveries outside acceptance limits. However, since the associated method blanks and check were in control, no corrective action was necessary.

No ICP Trace Form IX was provided for batch 3344104. The serial dilution was performed on a different sample from the same QC batch(es).

GENERAL CHEMISTRY

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031203-JR-ELF-GW-U-MW101 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The MS/MSD(s) for 031203-JR-ELF-GW-U-MW101 had RPD's and/or recoveries outside acceptance limits. However, since the associated method blanks and check were in control, no corrective action was necessary.

CASE NARRATIVE

A3L030144

The following report contains the analytical results for ten water samples submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 03, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 22, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the coolers upon sample receipt was 1.0 and 4.0°C.

GC/MS SEMIVOLATILES

The analytical results met the requirements of the laboratory's QA/QC program.

PESTICIDES-8081

Batch 3337348 had recoveries and/or RPD's out high in the LCS. Since there were no hits detected in any of the associated samples, no corrective action was necessary.

For samples 031202-JR-YCL-GW-U-MW301, 031202-MC-YCL-GW-U-MW500B, 031202-JR-YCL-GW-U-MW105 and the Blank in batch 3337348 the recovery for one of two surrogate compounds is outside acceptance criteria, so no corrective action was required.

CASE NARRATIVE (continued)

POLYCHLORINATED BIPHENYLS-8082

The analytical results met the requirements of the laboratory's QA/QC program.

METALS

No ICP Trace Form IX was provided for batch 3339107. The serial dilution was performed on a different sample from the same QC batch(es).

GENERAL CHEMISTRY

The analytical results met the requirements of the laboratory's QA/QC program.

CASE NARRATIVE

A3L060139

The following report contains the analytical results for four water samples submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 06, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 22, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the cooler upon sample receipt was 1.9 and 0.8°C.

GC/MS SEMIVOLATILES

The analytical results met the requirements of the laboratory's QA/QC program.

PESTICIDES-8081

The analytical results met the requirements of the laboratory's QA/QC program.

POLYCHLORINATED BIPHENYLS-8082

The analytical results met the requirements of the laboratory's QA/QC program.

CASE NARRATIVE (continued)

METALS

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031205-JR-RLF-GW-U-MW111 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

GENERAL CHEMISTRY

Sample 031205-JR-EFL-GW-U-MW104 was analyzed for Sulfide outside of holding time due to a laboratory oversight.

CASE NARRATIVE

A3L050191

The following report contains the analytical results for twenty-four water samples submitted to STL North Canton by Weaver Boos & Gordon Inc from the Yeoman Creek Landfill Site, project number 0081300-04. The samples were received December 05, 2003, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Mike Maxwell on December 17, 2003. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 1.0 and 1.1°C.

METALS

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes flagged with "E".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031204-MC-YCL-GW-U-MW202 and 031204-MC-YCL-GW-F-MW202 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

CASE NARRATIVE (continued)

METALS (continued)

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(s) 3344104 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The MS/MSD(s) for 031204-MC-YCL-GW-U-MW202 and 031204-MC-YCL-GW-F-MW202 had RPD's and/or recoveries outside acceptance limits. However, since the associated method blanks and check were in control, no corrective action was necessary.

The MS/MSD(s) for batch(s) 3344104 had RPD's and/or recoveries outside acceptance limits. However, since the associated method blanks and check were in control, no corrective action was necessary.

GENERAL CHEMISTRY

The sample(s) had elevated reporting limits due to matrix interferences. Refer to the sample report pages for the affected analyte(s) flagged with "G".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 031204-MC-YCL-GW-U-MW202 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".



GEOSYNTEC CONSULTANTS

55 W. Wacker Drive, Suite 1100
Chicago, Illinois 60601

TO: Mr. Matthew Ohl
U.S. Environmental Protection Agency
77 W. Jackson Blvd.
Mail Code SR-6J
Chicago, IL 60604

Date: 9 March 2004
Project: CHE8092

TRANSMITTAL

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| <input checked="" type="checkbox"/> ENCLOSED | <input type="checkbox"/> PLAN | <input type="checkbox"/> DRILLING LOGS | <input type="checkbox"/> APPROVED |
| <input type="checkbox"/> UNDER SEPARATE COVER | <input type="checkbox"/> COST ESTIMATE | <input type="checkbox"/> BADGES | <input type="checkbox"/> APPROVED AS NOTED |
| <input type="checkbox"/> MESSENGER | <input type="checkbox"/> DRAWINGS | <input checked="" type="checkbox"/> DOCUMENTS | <input type="checkbox"/> RESUBMIT |
| <input type="checkbox"/> FIRST CLASS MAIL | <input type="checkbox"/> SPECIFICATIONS | <input type="checkbox"/> CONTRACTS | <input type="checkbox"/> RETURN |
| <input type="checkbox"/> SPECIAL DELIVERY | <input type="checkbox"/> SHOP DRAWINGS | <input type="checkbox"/> FOR APPROVAL | <input type="checkbox"/> CORRECTED PRINTS |
| <input type="checkbox"/> HAND DELIVERY | <input type="checkbox"/> CD/DISKETTE | <input type="checkbox"/> FOR YOUR USE | <input type="checkbox"/> FOR COMMENT |
| <input checked="" type="checkbox"/> FEDEX | <input type="checkbox"/> PHOTOS | <input type="checkbox"/> AS REQUESTED | |

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Remarks:

Cc: Om Patel, Weston
Erin Rednour, IEPA

Signed: John Seymour, P.E.
GeoSyntec Consultants